

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	10/723,533
Applicant	Bhattacharya, et al.
Filed	November 26, 2003
Art Unit	2835
Examiner	Chervinsky, Boris Leo
Attorney Docket No.	111079-135105
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Mail Stop Amendment  
Commissioner for Patents  
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Alexandria, VA 22313-1450

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

In the Office Action mailed August 16, 2006 ("Office Action"), claims of the above-captioned application were rejected for a second time. Applicants hereby appeal this decision of the Examiner to the Board of Patent Appeals and Interferences according to 35 U.S.C. §134 and submit a Notice of Appeal in compliance with 37 C.F.R. §41.31 contemporaneously with the present request. Prior to the filing of the Appeal Brief, Applicants respectfully request that a panel of examiners formally review the legal and factual basis of the rejections in the above-captioned application in light of the remarks to follow.

**REMARKS/ARGUMENTS**

**I. Status of Claims**

Claims 32-58 are pending.

Claims 32-39 and 41-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat (US Pat. No. 5,402,004) ("Ozmat") in view of Dessiatoun et al. (US App. No. 2003/0227732) ("Dessiatoun"); claim 40 is rejected under 35 USC 103(a)

as being unpatentable over Ozmat in view of Dessiatoun and further in view of Landin (US Pat. No. 6,410,160) ("Landin").

## **II. Claim Rejections under 35 U.S.C. §103(a)**

Claim 32 recites, in part, a porous medium attached to a plate of a case, the plate being attached to the surface of a die. Interpreting this element in light of the specification, e.g., Figure 1 and associated discussion, makes it clear that the plate is in contact with the surface of the die. As discussed in the specification, and on pages 6 and 7 of Applicant's response dated June 30, 2006 (hereinafter "Response"), this arrangement provides various heat transfer efficiencies compared to the prior art.

In the Office Action there is no discussion as to how either Ozmat or Dessiatoun are interpreted to teach this arrangement. As discussed on page 7 of the Response, Ozmat fails to teach this arrangement for at least the reason that it provides one or more structures between the metal matrix composite (MMC) plate **13** and the die. For example, Ozmat teaches coupling of the MMC plate **13** to the chips **3**, **7**, and **9**, through interposing structures such as solder balls (shown in FIG. 3, but not discussed) and a substrate **11**. Therefore, the MMC plate **13** is not attached to the surface of the chips **3**, **7**, or **9** as this element would be understood by one skilled in the art in the context of the present specification.

Dessiatoun also fails to teach this arrangement for similar reasons. While the figures of Dessiatoun do not show much detail, it is clear that Dessiatoun teaches chips being coupled to a circuit board, with the circuit board being coupled to the heat transfer module. See paragraph [0087]. Accordingly, one skilled in the art would interpret this reference to teach an arrangement similar to FIG. 3 of Ozmat, where the chip is coupled to a board through solder balls and the board is coupled to the heat transfer module.

Claims 33-45 and 50-58 depend from, or include limitations similar to, claim 32. In addition to the omitted elements discussed above with respect to claim 32, Ozmat and Dessiatoun also fail to teach at least the following features:

- with respect to claim 34 – the porous medium being configured based at least in part on a non-uniform heat distribution over the surface of the die (Ozmat/Dessiatoun, at best, teach non-uniform heat distribution over a

circuit board, neither arrangements account for heat gradients within the die itself);

- with respect to claims 39 and 56 - the porous medium having different pore diameters corresponding to different thermal outputs of areas of the die (see above note with respect to claim 34);
- with respect to claim 42 - the pump facilitating a fluid flow at rate to result in two-phase flow (Examiner states that pumping the fluid rate too slowly, resulting in two-phase flow is obvious – this unsupported, conclusory statement is insufficient to establish a *prima facie* case of obviousness. "The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success." *Rockwell Int'l Corp. v United States*, 147 F.3d 1358 (Fed. Cir. 1998).
- with respect to claim 43 - a substrate coupled to the die on the side opposite the thermal management device (Examiner cites references disclosing this element in isolation, without providing any teaching, suggestion, or motivation to combine these teachings with Ozmat and/or Dessiatoun);
- with respect to claims 44 and 53 - fluid flow is primarily induced by natural buoyancy of the fluid (both Ozmat and Dessiatoun disclose forced fluid flows through thermal management devices, therefore the fluid flow of these references is not primarily induced by natural buoyancy);
- with respect to claim 45 - the case hermetically encompassing the porous medium (both Ozmat and Dessiatoun disclose a case having an inlet and an outlet, therefore the case does not hermetically encompass the porous medium).

Accordingly, for at least these reasons, the Examiner has failed to provide a *prima facie* case of obviousness in the rejection of these claims since the combination of Ozmat and Dessiatoun fail to make these claims, when viewed as a whole, obvious.

Claim 46 recites, in part, a microporous medium attached to a die and disposed within a cavity of a case. Interpreting this element in light of the specification, e.g., Figure 2 and associated discussion, makes it clear that the medium is contact with the surface of the die. As discussed in the specification, and on pages 6-8 of the Response, this arrangement also provides for various heat transfer efficiencies compared to the prior art.

In the Office Action there is no discussion as to how either Ozmat or Dessiatoun are interpreted to teach this arrangement. However, it is clear that neither Ozmat nor Dessiatoun have their cooling structures, sponge and pin fins, respectively, attached to a die. As discussed above, the cooling structures are coupled to the die through a number of interposing structures, e.g., case plate, an MMC plate, a circuit board, solder balls, etc.

Furthermore, neither Ozmat nor Dessiatoun teach, suggest, or imply a microporous medium. As discussed on page 11 and 12 of Applicants' response mailed June 28, 2005, Ozmat specifically teaches away from having small pore size medium due to the associated high flow resistance. Dessiatoun does not teach pores at all, much less pores in a micro-scale.

Claims 47-49 depend from claim 46. In addition to the omitted elements discussed above with respect to claim 46, Ozmat and Dessiatoun also fail to teach at least the following features:

- with respect to claim 47 – a sealant to at least facilitate a watertight seal between the case and the die (both Ozmat and Dessiatoun teach the fluid being within the case, therefore there is no reason to teach a watertight seal between the case and the die);
- with respect to claim 48 – porous medium being attached to the die with a thermal interface material (as discussed above with respect to claim 46, neither Ozmat nor Dessiatoun teach a porous medium being attached to a die at all);
- with respect to claim 49 – the porous medium having dimensions similar to the die (The Examiner states that a mere change in size is generally within the level of one of ordinary skill in the art. However, this is true only when

it was known that the prior art is capable of being scaled to the claimed dimensions. There is no teaching in the prior art that the cooling structures of Ozmat or Dessiatoun are capable of being scaled to the claimed dimensions, much less there being a desire to do so.)

Accordingly, for at least these reasons, the Examiner has failed to provide a *prima facie* case of obviousness in the rejection of these claims since the combination of Ozmat and Dessiatoun fail to make these claims, when viewed as a whole, obvious.

### **III. Conclusion**

Applicants submit claims 32-58 are in condition of allowance. Issuance of the Notice of Allowance is respectfully requested.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.

Respectfully submitted,  
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